REMARKS

Applicants respectfully request reconsideration of both rejections in view of the foregoing amendment and following remarks. Claim 1 was amended to clarify the subject matter that the resonator is designed for mass changes. Support for this amendment is found in the specification on page 1 line 10 and page 7 lines 19-27. No new matter has been added. Acceptance of the foregoing amendment is respectfully requested. Claims 1-13 and 23-28 are pending.

35 U.S.C.§102 Rejection

Claims 1, 2, 4, 8-10, 23 and 24 were rejected under 35 U.S.C. §102 as anticipated by Larue (US Patent 5,705,399). The Examiner alleged that Larue discloses a thickness shear mode (TSM) piezoelectric resonator and discloses a "method for use in detecting/measuring an analyte in a medium (capable of use with any fluid)." Applicant respectfully traverses this rejection because Larue is mischaracterized in the rejection and does not disclose a TSM having the dimensions and characteristics of the presently claimed invention.

The Examiner pointed to Figures 2a and 2b in Larue and has alleged that Larue discloses "[A] a quartz crystal plate (16) having two flat (as recited in claim 10) crystal surfaces (first and second) [B] wherein the first crystal surface comprises a first electrode (10) having a surface area smaller than the surface area of a second electrode (6) on the second crystal surface (as recited in claim 4) and [C] wherein the first crystal surface has a first contacting area connected to the first electrode, as well as the second crystal surface and second electrode (as recited in claims 8 and 9) and [D] wherein the surface area of the first electrode is 6.25 mm^2 (i.e. radius = 2.5mm) meeting limitations of claims 1 and 2)." [Bracketed letters added for reference] Applicants respectfully traverse this rejection because the Examiner's comparison of dimensions of Laure to the claimed invention is incorrect.

The claimed invention provides a series of limitations in claim 1, particularly, the "first crystal surface comprises a first electrode having a surface area of less than 15 mm^2." This relates to allegation D above. Larue on column 6 line 22 indicates only that the first electrode is "ring shaped" but not that the entire electrode is a solid circular shape. This notion of a ring electrode (as opposed to a solid circular shape or disk shape) in Laure is reinforced in claim 1 of Laure wherein the first electrode is described according to the dimensions of the outer and inner perimeters of the ring shaped first electrode. Moreover, column 9 lines 52-59 of Laure reinforce that the first electrode is in a ring shape having an area of 0.1885 cm^2 and an outer perimeter radius of 3.5mm. If the Laure first electrode were in the shape of a circle or disk, not a ring, it would have an area of around 38.4 mm^2 and not the listed 0.1885 cm^2. Accordingly, an area of 38.4 mm^2 falls well outside of the scope of claim 1.

In addition, the first electrode of the present invention is described in the specification (see the paragraph spanning pages 10-11) as having a defined edge distance between the outer edges of the first electrode and the crystal edge. Such geometry of the electrode must have a solid geometric shape (including the rectangular shape of claims 6 and 7). Laure, by contrast, describes a ring shape or something hollow having two edges, an inner edge and an outer edge, exposing the crystal surface to at least the hollow part within the ring electrode. The fact that Laure describes only a thin ring shape is reinforced by the above-noted surface area calculations that provide areas that can only be accomplished with a ring structure, not a solid circle, when using the standard $pi(\Pi)*r^2$ geometric formula.

Accordingly, Laure does not anticipate the invention of claims 1, 2, 4, 8-10, 23 and 24 because the subject matter of claims 1, 2, 4, 8-10, 23 and 24 does not encompass a ring shaped first electrode.

35 U.S.C.§103 Rejection

Claims 1-5 and 8-10 were rejected as unpatentable under 35 U.S.C. §103 over Josse et al. (U.S. Patent 5,852,229). The Examiner alleges that Josse et al. discloses a TSM piezoelectric resonator and the method "for use in detecting/measuring an analyte in a medium." The Examiner further states that Josse et al. does not disclose the "specific quantitative surface area, that is, specific dimensional/geometric aspects of the electrodes." However, the Examiner alleges that Josse et al. suggests "[t]he variations in electrode structure can increase the sensitivity of the resonator, the ability to sense a variety of materials of interest and the ability to determine concentration of one of more materials of interest. Applicants respectfully traverse this rejection because Josse et al. suggests various analytical approaches through changes in electrical properties (that is, conductance, see column 1 lines 7-8) and not solely through changes in mass as is done according to the claimed invention.

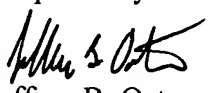
Claims 1-5 and 8-10 are directed to a resonator comprising (claim 1) "[1] a quartz crystal plate [2] having a first crystal surface and [3] a second crystal surface, said first crystal surface comprises [4] a first electrode having a surface area of less than 15 mm^2 said second crystal surface comprises [5] a second electrode." The bracketed numbers are provided for reference. Josse, by contrast, provides and electrode designed to measure conductivity changes, not mass. The preamble to claim 1 provides a resonator "for use in a sensor arrangement for detecting or measuring an analyte in a medium by mass changes." Josse et al. does not disclose or suggest that a smaller electrode on the liquid side increases the mass sensitivity of the sensor. Instead, Josse et al. teaches away from the claimed invention of claims 1-5 and 8-10 by disclosing that the effective surface area on the sensor surface facing the liquid will increase when the surface is exposed to a highly conductive sample or medium, then forming a sensor with equal effective electrode areas.

Therefore, using a Josse et al. design, mass sensitivity will always remain the same irrespective of actual surface area of the liquid side electrode. Josse et al. further discloses (col. 4 lines 8-26) that its liquid side or "first side" electrode is essentially round while its second electrode is any shape so long as its different from the shape of the first electrode. However, as noted by the Examiner, Josse et al. does not disclose the key dimension recited in the claimed invention (see limitation #4 bracketed above).

Therefore, as the Examiner has noted in the Office Action, Josse et al. does not disclose or suggest the key area limitation of claim 1 (limitation #4). There is no disclosure in Josse to suggest the key dimensional limitation. Moreover, as Josse et al. discloses a conductivity measuring device, not a mass sensor, one of ordinary skill in the art would not interpret the key dimensions nor would such a person of ordinary skill in the art look to Josse et al. to determine key dimensions of the liquid side electrode. Accordingly, no *prima facie* case of obviousness can be established because Josse et al. does not disclose or suggest the invention of claim 1 or of claims 2-5 and 8-10 that depend on claim 1.

In view of the foregoing remarks, applicant respectfully requests withdrawal of the two rejections and allowance of claims 1-13 and 23-28 as amended.

Respectfully submitted,



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